CLAIMS

1. A method of protecting a local area of a gas turbine component (1) from the effects of thermochemical or mechanical processes carried out on the surface (6) of component (1), the method comprising the steps of
   (a) applying a masking material (5) to the local area so that the local area is protected by the masking material (5), said masking material (5) containing at least one filler material,
   (b) at least partially thickening the masking material (5),
   (c) carrying out the thermochemical or physical removal process for the removal of material from the surface (6) of the component (1) and
   (d) removing the thickened masking material (5) from the local area of the component (1).

2. The method according to claim 1,
   wherein the local area to be protected is a braze joint, a cooling hole (4), a local part of a coated area or any other area of a gas turbine component (1) which is sensitive to the thermochemical and/or physical removal process.

3. The method according to claim 1,
   wherein a protective coating (8) is removed by the thermochemical or physical process from the external surface (6) of the gas turbine component (1) and during the process as local area cooling holes (4) are protected with the applied and thickened masking material (5).

4. The method according to claim 3,
   wherein the masking material (5) is applied to the cooling holes (4) from the external surface (6) or from an internal cavity (2) of the component (1).

5. The method according to any of the claims 1 to 3,
wherein the masking material (5) is thickened by the use of an energy source (7), whereby the energy impinges from the outside or from an internal cavity (2) of the component (1) to the masking material (5).

6. The method according to any of the claims 1 to 3,
wherein after applying the masking material (5) the surface (6) of the component (1) is cleaned by mechanical means to remove any unwanted residual masking material (5).

7. The method according to any of the claims 1 to 3,
wherein a masked material (5) which comprises a substance which fluoresces under ultraviolet light is applied.

8. The method according to claim 7,
wherein carrying out an inspection using ultraviolet light to locate any unwanted residual masking material (5) on the surface (6) of the component (1) and removing this unwanted residual masking material (5) from the surface by mechanical means.

9. The method according to claim 8,
wherein after removing unwanted residual masking material (5) a re-inspection is carried out using ultraviolet light to locate any further unwanted residual masking material (5).

10. The method according to claim 8,
wherein after removing unwanted residual masking material (5) masking material (5) is reapplied to the local area.

11. The method according to any of the claims 1 to 3,
wherein the thermochemical or physical process is one or a combination of a chemical etching method, acid or alkaline stripping, water jet stripping, grit blasting, high speed grit blasting or another abrasive technique.

12. The method according to any of the claims 1 to 3,
wherein the component (1) is heated before or during the method to facilitate the application and/or thickened of at least a portion of the masking material (5).

13. The method according to any of the claims 1 to 3,
wherein the masking material (5) is applied in a step wise fashion in which it is at least partially thickened before applying the next amount in the cooling holes (4).

14. The method of claim 13,
wherein the amount of filler is changed from layer to layer of masking material (5).

15. The method of claim 14,
wherein the masking material (5) of the last layer contains 30 – 80 vol.-% filler material with a grain size of 40 – 150 μm to a depth not less than 1 mm.

16. The method according to one of the claims 1 to 15,
wherein the fillers added to the masking material (5) include particles or fibres of metal, oxide material such as silica, magnesia, calcia, alumina, zirconia, yttria or a mixture thereof and organic materials.

17. The method of claim 16,
wherein the filler content is in the range of 10 – 90 vol.-%.

18. The method of claim 17,
wherein the filler content is in the range of 20 – 60 vol.-%.

19. The method according any of the claims 1 to 18,
wherein the filler particle diameter size is on average, or contains mixtures with average diameters, ranging from 1 μm to 500 μm.

20. The method according to claim 19,
wherein the filler particle diameter size is on average, or contains mixtures with average diameters, ranging from 10 μm to 150 μm.

21. The method according to claim 20,
wherein the filler particle diameter size is on average, or contains mixtures with average diameters, ranging from 40 μm to 100 μm.

22. The method according to claim 1 to 21,
wherein the removal of the thickened masking material (5) from the local area is done by burning it out and a final removal of any residual masking material (5) from the local areas is completed the by water jet machining or by an ultrasonic cleaning treatment.

23. The method according to claim 22,
wherein the step of the removal of any residual masking material (5) in cooling holes (4) is done by locating the cooling holes (4) using a vision system which directs a CNC machine.

24. The method according to one of the claims 1 to 23,
wherein the masking material (5) is a photopolymerizing resin or a mixture of resins and photoinitiator which polymerize with exposure to ultraviolet light.

25. The method according to one of the claims 1 to 23,
wherein the masking material (5) is a UV polymerizing plastic such as polyurethane, a polyurethane oligomer mixture, 2-Hydroxyl Methacrylate, Isobornyl Acrylate, Maleic acid, methyl methacrylate, butyl acrylate co-polymer, acrylic acid, T-Butyl Perbenzoate, poly(isobutyl methacrylate), poly(vinyl toluene), polyproplyene or a polypropylene / polyurethane oligomer mixture, the class of polymers vetones or silicones, or any mixture thereof.

26. The method according to of claim 25,

wherein thickened masking material (5a) containing the filler material is heated or processed so as to volatilize or otherwise remove the volatile, not polymerized organic portion of the masking material (5) before the thermochemical or physical process on the surface of the component is carried out.

27. The method according to claim 25,

wherein there are included in the masking material (5) binding agents which are effective in holding together the solid particles or fibres of the filler material after the organic portion of the masking material (5) is removed.

28. The method according to one the claims 1 to 27,

wherein the masking material (5) is thickened by an energy source (7), which is electromagnetic such as visible, ultraviolet or infra-red light or collimated light such as laser.

SUMMARY

It is disclosed a method of protecting a local area of components (1) from the effects of thermochemical or mechanical processes carried out on the surface (6) of the component. A masking material (5) containing at least one filler material is applied to the local area so that the local area is protected by the masking material (5). This is at least partially polymerized on the local area. Subsequently the thermochemical or physical processes on the surface (6) of the component (1) are carried out after which the polymerized masking material (5) is removed from the local area of the component (1).

(Fig. 3d)